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ABSTRACT

The first of two sections of this paper describes a pilot program that used interactive video (IAV) technology to enhance the scripting skills of teacher certification assessors in the administration of a classroom observation technique. A comparative analysis was drawn between three groups of assessors: those who received IAV programed instructional training, video only training, and no training at all. A pretest was administered to the first two groups; all three groups received posttests. No differences were found in the results for the three training methods, and this is attributed to the strong scripting skills already possessed by the assessors. The second section provides descriptions of each of the components of the IAV system used in the scripting practice study. The appendices contain examples of teacher certification criteria to be observed in the classroom, questionnaires used in the study, an example of a feedback screen, and a visual diagram of IAV components. (6 references) (DB)

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USING INTERACTIVE VIDEODISC TECHNOLOGY TO ENHANCE ASSESSOR TRAINING

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USING INTERACTIVE VIDEODISC TECHNOLOGY TO ENHANCE ASSESSOR TRAINING

The purposes of this paper are twofold. In the first section of the paper a pilot program will be described that used interactive videodisc technology to enhance the scripting skills of assessors in the administration of a classroom observation instrument. The second section of this paper will focus on interactive videodisc technology with a discussion about each component of the system.

SECTION I: PILOT PROGRAM

In Connecticut, for purposes of licensure, teachers take a series of examinations at various stages of teacher preparation and during their first year in the classroom. In this project we focused on the Beginning Educator and Support (BEST) assessment program that takes place during the teacher's first year. This assessment utilizes the Connecticut Competency Instrument (CCI) and involves six independent classroom observations conducted by six trained assessors. The CCI results in one of three outcomes; a teacher is granted a provisional teaching certificate; a teacher is recommended for a second year of support and assessment; or a teacher is not eligible to pursue licensure.

The assessment begins with a preassessment interview, followed by a classroom observation period of 45 to 60 minutes when an assessor takes detailed notes (referred to as scripting). The scripting involves a comprehensive notetaking method designed to collect all relevant lesson content, instructional activities and classroom observations. A post-observation interview is then conducted which allows the beginning teacher an opportunity to clarify anything that occurred in the lesson that had not been previously explained. Following the observation, assessors categorize positive and negative evidence according to 22 defining attributes associated with 10 scoring indicators. Each indicator is then rated as acceptable or unacceptable based on a set of anchors established during training. The indicators and their defining attributes are presented in Appendix A.

Individuals participating as assessors attend over 70 hours of training and must pass a set of proficiency standards in order to be qualified to conduct assessments.

The development of the instrument, training of assessors and implementation of the program has been a large-scale and complex effort. For example, over the course of three years 1200 assessors have been trained in the state. Of this number, 450 proficient assessors evaluated over 700 beginning teachers during the 1990-91 school year.

Considering the large cadre of assessors and the high stakes nature of this assessment, it is particularly important that assessors maintain the quality of their scripting and apply their ratings according to state standards. Ensuring that assessors maintain uniform standards is achieved by ongoing communications with assessors and annual large-scale follow-up training and calibration sessions. However, due to the labor intensity of individualized script evaluation and feedback, along with costs associated with the use of trainers, there have been few opportunities available to allow assessors to independently practice and sharpen scripting skills.

Consequently, the primary purpose of this pilot study was to examine the feasibility of providing a training program that possessed the following characteristics:

-Practice opportunities to maintain scripting proficiency
-Practice that is individualized to meet the needs of each assessor
-Practice that requires minimal human intervention without reducing effectiveness
-Practice opportunities that result in high assessor acceptance
-Practice that is administratively feasible, cost effective, and can be flexibly scheduled

After evaluating several training options, we chose to develop a prototype training system based on a computer administered interactive videodisc system (IVD). Such a computer administered system has the capability to systematically deliver video segments of classroom instruction (referred to as vignettes), and then interactively administer and score questions that test for scripting accuracy. An IVD approach appeared to not only address the desired characteristics noted above but could be designed to allow immediate and focused feedback. However, if an IVD system was to be considered in a statewide program, it was also important to determine if such a system could withstand the rigors of frequent use by a variety of assessors.

In addition to the IVD system, we were interested in examining a "lower tech" and less costly approach to scripting practice. Accordingly, a small-scale study was conducted which compared an IVD approach to a conventional videotape presentation format. A description of this study follows.

Method

This study compared three groups of assessors; those who received IVD training, VIDEO training and CONTROL (no training). A pre-test was administered as part of the IVD and VIDEO training and all three groups received a post-test. A more detailed description of the method and procedures follow.

Subjects

All assessors that had recently attended update or new training in 1990 were invited to participate in a pilot study. In the invitation to assessors, the purpose of the study was described as an examination of the feasibility of using interactive videodisc workstations to review, practice and maintain the skills required in scripting. Of 700 invitations sent, 168 assessors expressed an interest in participating.

From their initial training, evidence writing scores were available for 153 of the 168 potential subjects. Evidence writing scale scores range from 0 to 106 and measure the assessor's ability to effectively use a written script. Incomplete or inaccurate scripts result in lower evidence writing scores. The actual evidence writing scores for the 153 potential subjects ranged from 59 to 104 with a mean of 94.52.

As an estimate of scripting ability, evidence writing scores were used as a basis for selecting the 62 subjects used in the study. Accordingly, the 62 subjects were placed into one of the three experimental groups (IVD, VIDEO, CONTROL). To ensure that each group represented a balanced range of initial scripting abilities, subjects were distributed according to low (less than 91), medium (92-99) and high scores (greater than 100) on the evidence writing scale.

As expected, this stratification procedure resulted in no significant differences between the three groups based on evidence writing scores, F=1.83, df=2,53, p=.17. The mean scores were: IVD group, $\bar{x}$=94.16; VIDEO group, $\bar{x}$=95.68 and CONTROL group, $\bar{x}$=93.39. The mean across groups was 94.43.

Fifty-five of the 62 subjects reported, as of the date of the post-test, that they had conducted between zero and 20 actual assessments. The mean number of assessments was 6.13 with a standard deviation of 5.15. There was no significant difference in the mean number of assessments conducted between the three groups, F=0.55, df=2,52, p=.58. The mean number of assessments were: IVD group, $\bar{x}$=6.95; VIDEO group, $\bar{x}$=6.22; and CONTROL group, $\bar{x}$=5.17.

Materials and Procedure

Pretest

This study consisted of a pretest for the IVD and VIDEO and a post-test for all groups (IVD, VIDEO, and CONTROL). For the IVD and VIDEO groups, the pre-test consisted of scripting two vignettes and responding to 33 multiple-choice questions based on the vignettes. The IVD subjects worked at one of four videodisc workstations. Each workstation consisted of a computer, monitor, keyboard, mouse, amplifier, speakers, headphones and a videodisc player. An administrator started the program and remained in the room during the session to observe and answer any questions that might arise.

Since the IVD system utilized a mouse as the primary source of subject input and selection, the program began with a mouse practice exercise. As scripting practice began, participants were presented with introductory screens describing the task and asked to enter their name and social security number. The scripting practice exercise consisted of two components.

In the first component, subjects were asked to script two vignettes. The first vignette consisted of 17 minutes and the second vignette 11 minutes of classroom instruction. Following each vignette, subjects were allowed time to clarify and review their scripts.

In the second component of scripting practice, a 33 item multiple-choice test was administered, 23 items covered the first vignette and 10 items covered the second vignette. The questions were developed by a committee of assessor trainers and were designed to evaluate whether subjects accurately scripted the kinds of classroom evidence most important to the CCI. Subjects were given immediate feedback about their response to each question. If a subject incorrectly answered a question, the relevant portion of the vignette was replayed and subjects were prompted to follow along in their scripts. If the subject answered the same question wrong again, a second screen was displayed. In the upper left quadrant of this screen, participants were presented with the relevant video. On the bottom half of the screen, a transcript for that part of the video was provided. Finally, in the upper right quadrant was a menu that allowed the user to control the video (stop, rewind, play), which page of the script they were observing, or to return to the question. Figure 1 illustrates the second feedback screen and Figure 2 illustrates the IVD scripting and questioning process.

During the course of the IVD session, start and stop times, responses to each question and subject identification information were recorded for all participants.

In the VIDEO condition, subjects assembled in two groups of approximately 10, and were asked to script the same two video vignettes that were viewed in the IVD condition. The video was presented on a single 20" monitor. After scripting the vignettes, subjects received the same 33 multiple-choice questions as used for the IVD group, but in paper-and-pencil format. After everyone completed the questions and responses were collected, subjects were given an opportunity to review the answer key.

The multiple-choice questions used in both the IVD and Video groups represented three types of questions. The first type was designed to measure assessor skill in recording verbatim evidence, the second was designed to measure the participant's practice of recording observational comments and the third was designed to examine the assessor's practice of scripting at critical points in the lesson. In both the IVD and VIDEO conditions, subjects were provided descriptions of the three types of questions after the multiple-choice questions were completed. Appendix B provides examples of each question type.

Post-test

Between two and three weeks after training took place the subjects in the IVD, VIDEO and CONTROL conditions were convened in groups of 20 to script a post-test vignette presented in videotape format on a 20" monitor. As with the VIDEO pretest, subjects were tested in small groups (n=20). After scripting the vignette, subjects were presented with 30 questions designed to assess their scripting accuracy.

Following the pretest and again following the post-test, subjects were asked to evaluate each component of the IVD and VIDEO practice procedures. Appendix C provides the IVD, VIDEO and post-test questionnaires.

Results

Post-test performance of the three groups was not found to be significantly different, F=.80, df=2,50, p=.45. Likewise no significant differences were found between the groups on the three question types: Verbatim Evidence, F=1.04, df=2,50, p=.36; Observational Comments, F=.49, df=2,50, p=.61; Critical Points in the Lesson, F=2.24, df=2,50, p=.12. The means for these ANOVAS are shown in Table 1. The overall score was based on 30 items, of which, 15 items covered verbatim evidence, 9 items assessed observational comments and 6 items were related to critical points in the lesson.

Table 1
Post-test Means

Groups	Overall Score		Verbatim Evidence		Obser. Comments		Critical Points		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	N
CONTROL	23.72	2.87	11.83	1.58	6.72	1.27	5.17	0.92	18
IVD	22.53	2.85	10.94	1.78	7.00	1.17	4.59	1.12	17
VIDEO	23.06	2.67	11.39	2.09	7.11	1.18	4.56	0.86	18

A second set of analyses was conducted comparing the IVD and VIDEO groups and using pretest scores as covariates. Again, no significant effects were found. Tables 2 and 3 summarize the results. The percentage of correct answers was used for these analyses.

Table 2
Analyses of covariance

	Groups			Covariate		
	F	*df*	*p*	*F*	*df*	*p*
Overall Score	0.01	1,28	.908	12.57	1,28	.001
Verbatim Evidence	0.34	1,28	.563	5.37	1,28	.028
Obser. Comments	0.00	1,28	.988	7.37	1,28	.011
Critical Points	0.30	1,28	.585	1.72	1,28	.200

Table 3
Means on the Post-test Dependent Measures

	Overall Score		Verbatim Evidence		Obser. Comments		Critical Points		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	N
IVD	0.75	0.10	0.72	0.12	0.78	0.13	0.76	0.19	17
VIDEO	0.76	0.10	0.74	0.14	0.81	0.13	0.75	0.16	14

To assess whether there were increases in scripting skills between the pretest and post-test, a repeated measures ANOVA was conducted comparing the IVD and VIDEO groups. Again, the percentage of correct answers was used instead of the number of items correct. For the purpose of these analyses, it was assumed that the items were of equal difficulty.

As indicated in Table 4, no significant effects of Group or the Group by Time (pretest vs post-test) interaction were found. There was, however, a significant effect of Time on the overall score and observational comments measures. On overall scores, subjects significantly increased their percentage of correct answers between the pretest ($\bar{x}$=0.71) and the post-test ($\bar{x}$=0.76).

Likewise, on the observational comments questions, subjects significantly increases their percentage of correct answers between the pretest ($\bar{x}$=0.61) and the post-test ($\bar{x}$=0.79).

Table 4

Repeated Measure ANOVAS

	Group			Time			Group x Time		
	F	*df*	*p*	*F*	*df*	*p*	*F*	*df*	*p*
Overall Score	0.16	1,29	.69	7.20	1,29	.01	0.00	1,29	.92
Verbatim Evidence	2.07	1,29	.16	1.40	1,29	.25	3.47	1,29	.07
Obser. Comments	1.66	1,29	.21	45.72	1,29	.00	0.79	1,29	.38
Critical Points	0.73	1,29	.73	3.21	1,29	.08	1.97	1,29	.17

After both the VIDEO and IVD pretests, subjects were given a questionnaire designed to assess: 1) the types of scripting opportunities subjects would most likely attend and, 2) the effectiveness of the various components of the pretest training. The scripting opportunities were rated on a five point scale ranging from 1=unlikely to attend to 5=highly likely to attend. There was no significant difference between the VIDEO and IVD groups in their preference for a one-on-one refresher course with a BEST trainer, a small group refresher session or for videotape practice at home. There was, however, a significant difference in subjects preference for the type of training they had just experienced (t=3.36, df=39, p=.002). Subjects in the IVD condition were more likely to prefer individual videodisc practice ($\bar{x}$=4.58) than subjects in the VIDEO condition were to prefer individual videotape practice ($\bar{x}$=3.59). The means for each question are presented in Table 5.

Table 5

Practice Preferences

Preferences:	VIDEO	IVD
One-on-One Refresher with BEST trainer	4.11	3.95
Small Group refresher session	4.39	4.23
Individual (Videotape/ Videodisc) practice	3.59	4.58
Videotape practice at at home	3.63	3.95

There were also significant differences in the effectiveness ratings between the VIDEO and IVD groups. Effectiveness was measured on a five point scale ranging from 1=Ineffective to 5=Highly Effective. IVD subjects found the choice of vignettes more effective (t=3.21, df=42, p=.003), the overall feedback more effective (t=3.10, df=40, p=.004) and overall, the pretest practice session more effective (t=3.21, df=41, p=.003). There was no significant difference in the effectiveness rating on the multiple-choice questions that were used. Table 6 provides the mean effectiveness ratings.

Table 6
Mean Effectiveness Ratings

Practice components	Groups	
	VIDEO	IVD
Choice of Vignettes	3.58	4.28
Multiple Choice Questions	4.05	4.17
Overall Feedback	4.00	4.68
Overall Effectiveness	3.95	4.54

In addition to the effectiveness ratings reported above, subjects in the IVD condition were asked to rate additional aspects of practice that were unique to the IVD condition. These subjects found the mouse training ($\bar{x}$=4.28) and the use of the mouse to answer questions ($\bar{x}$=4.36) highly effective. Even more effective were the instructions on the computer screens ($\bar{x}$=4.52). Last, both the first form of feedback, the replay of the video segment associated with the questions ($\bar{x}$=4.76) and the second form of feedback, the replay and transcript information ($\bar{x}$=4.50) were found to be highly effective.

IVD group subjects were also given an opportunity to make comments during a short debriefing interview. A brief summary of these comments, classified as positive or negative, are summarized below:

Positive Comments

Positive comments were generally focused on three areas; positive overall expressions about the training, comments about their willingness to participate if such training was available, and comments about the individualized nature of the feedback.

Seventeen of 22 participants in the IVD group expressed overall satisfaction with the practice program. Example: "Loved it, enjoyed whole process, feel it's personal and have control over it."

Many participants (15 out of 22) found immediate feedback of the IVD program very attractive. Example: "A good way of finding out what you missed", "liked the immediate feedback and liked the form of feedback."

Also, 15 out of 22 participants mentioned they would take advantage of the IVD practice program if such an opportunity was available.

Several participants (5 of 22) liked the individualized nature of practice. Example: "liked personal control over the process", "did not feel embarrassed or intimidated as one sometimes experiences in group training."

Negative Comments

Few subjects made negative comments about the IVD practice program. The negative comments that were expressed focused primarily around three issues; the nature of the multiple-choice questions; the resemblance of the practice activity to the actual classroom and several comments about the hardware.

As discussed earlier, the multiple-choice questions were designed to test the assessor's ability in three areas of scripting, verbatim evidence, observational comments, and critical points. Questions associated with observational comments were developed to encourage assessors to increase their observations of the classroom (e.g., what is on the blackboard, how are desks arranged, where are students sitting, etc.). Consequently, some assessors did not expect to encounter questions requiring such a close attention to classroom detail and commented accordingly.

Seven of 22 subjects found some of the multiple-choice questions too specific or not associated with the most important activities found in the classroom.

When assessors actually perform observations in classrooms they are given the opportunity to first interview the teacher and provided an overview of the lesson prior to the observation. Three comments were made that the IVD practice program did not mirror actual classroom observations: no preassessment information was made available; the vignettes were too short; and scripting done in the IVD practice differed from that found in the classroom.

There were also several comments associated with IVD practice program itself.

Three subjects found it sometimes difficult to hear the students.
Two subjects had minor difficulties using the mouse.
One subject commented that the experience was, "grueling and felt under pressure."
Another participant suggested that other assessors might not take advantage of this system because they are fearful of computers.

Summary and Discussion

In this pilot study we were interested in examining two major questions. First, how effective is the IVD approach compared to practice that involves conventional videotape procedures. Second, how well does the IVD systems work under field conditions.

Answers to these questions, in part, were based on several sources of information. The results of the 33 item multiple-choice pretest, a 30 item post-test, an IVD and VIDEO pretest questionnaire and a IVD, VIDEO and CONTROL post-test questionnaire.

As noted in the results, regardless of the condition (IVD, VIDEO or CONTROL), the training groups appeared to have no differential effect on performance. There are several likely explanations for such a finding. First, as indicated by the evidence writing scores, subjects involved in this study demonstrated strong scripting skills at the outset. Second, mean scores on both the pretest and post-test indicate that these measures were relatively easy. The easiness of the questions in part, was due to the use of short vignettes which may have capitalized on short term memory rather than scripting accuracy. Finally, given the information that was provided to subjects in their invitations to participate, there was no way of determining the amount of preparation that may have taken place prior to the onset of the study. Each of these explanations, likely masked any differences that may have existed between the training approaches.

Although no differences were found between training groups, there were differences between the pretest and post-test overall scores for both the IVD and VIDEO groups. This difference was largely due to the significant increase in correctly answering observational comment questions. This suggests that both IVD and VIDEO practice are viable training approaches for proficient assessors.

As a practice program, subject evaluations favored the IVD approach. The primary reasons for high subject acceptance appeared due to the highly individualized, and focused feedback, the ability to control and replay selected video segments, and the automated scoring. In addition, the novelty associated with this new technology likely contributed to the attractiveness of this training approach.

Evidence from this study indicates that proficient assessors are not likely to demonstrate large performance gains from this type of training. This is due primarily to the finding that assessors in this study already possessed strong scripting skills. The IVD and VIDEO training procedures would likely have a greater impact for those individuals first learning to script.

For individuals first learning to script, IVD training offers a number of advantages over VIDEO training. As we discovered, assessors preferred a method that provided individualized training and feedback. In addition, subject's ratings of training effectiveness was highest for the IVD program. It is noteworthy that participants in the IVD group clearly preferred IVD training over all other options. By contrast, participants in the VIDEO group preferred all other training options over individualized videotape practice.

Regarding how well the IVD workstations operated in the field, we found, that in only one session out of 22 was there a system malfunction. In this case, a subject was simply rescheduled and the problem did not reappear. Based on the pilot study, we found that the IVD practice program required only the presence of a program administrator to start the program and to be available to answer questions. Consequently we are confident that IVD systems offer a viable approach to training where little additional human resources is needed. As with any hardware and software, however, problems can and will occur and appropriate backup systems should be in place to handle such situations.

Based on these findings and the fact that IVD training offers administrative flexibility, cost effectiveness, and requires little trainer intervention, a program is now being developed to examine the feasibility of using IVD procedures to train beginning assessors to script.

SECTION II: INTERACTIVE VIDEODISC SYSTEM

This section of the paper describes and discusses each component of the IVD system utilized in the scripting practice study (See Figure 3).

Videodisc

Before detailing the IVD system, it is important to first understand why videodisc media was selected for this particular application. After all, it would be much easier to simply use conventional videotape to train assessors to practice scripting. One of the primary reasons for using IVD technology is based on the degree of control that can be achieved with such a format.

The videodisc can be compared to an LP record (remember those) that can contain up to 54,000 individual video frames (pictures) on each side of a disk. If the disc is recorded in CAV (Constant Angular Velocity) format, it may contain up to 30 minutes of full motion video per side. The CAV format operates as follows. A standard 30-minute disc maintains a constant speed of 1800 rpm while varying the track length for each picture. Each revolution of the disc (or track) corresponds to a picture containing a frame number much like the pages of a picture album.

It is the frame numbers that allow the capability to find and retrieve specific frames on the disc. In contrast to the CAV format there are extended play videodiscs that allow for as much as 60 minutes of full motion video per side. This longer play version of the videodisc uses a format referred to as constant linear velocity (CLV) which spins the disc at rates ranging from 600 to 1800 rpm. Unfortunately, the trade-off with the CLV format is the inability to search and play specific frame numbers. It is possible to search and playback only those portions of the disc that have been recorded with chapter numbers. Similar to the chapters of a book, these numbers allows some degree of search and playback capability that would not be possible with a conventional vcr. For purposes of this project, CAV format afforded the control necessary to provide interactive scripting practice.

Most importantly, CAV format when used with a personal computer allows for random access capability. For example, like the hard disk drive of a personal computer, an IVD system can instantly search, find, and play any of the 54,000 frames. This means that unlike conventional vcrs that perform very slow and inaccurate searches, an IVD system can be programmed to provide nearly instantaneous search and playback that is under the control of the user.

In addition to providing video information, the videodisc's two audio tracks can be used to reproduce high quality stereo or may be used be used to play in two different languages. For both the video and audio information, the reproduction quality is very high.

Another attractive feature of videodiscs is that they are virtually impervious to damage by fingerprints, magnetism, dust, humidity and temperature.

To produce a videodisc requires high quality video source materials. Generally speaking, to achieve such quality involves video recording on 3/4" to 1" videotape. In addition to the quality of the video tape, special editing must be done to adjust for differences that exist between videotape and videodisc formats. Because the pressing of the videodisc from the edited videotape requires specialized and costly equipment, there are presently only a few such production facilities available. For this project, we utilized Telstar Editing to press the videodiscs.

Videodisc Player

For this project, a Pioneer LD-V8000 LaserDisc player was utilized. This player was selected for its .5 second access time. That is, selected portions of the video on any area of the disc can be searched and ready for playback within .5 second. Access time is important if you want to provide immediate feedback to participants, as was the case in this study, or if you plan to play selected video portions from the same videodisk but want to give the appearance that the video is continuous.

A variety of videodisc players are available some of which are provided below:

Sony LDP 1000; LDP 1200; LDP 1500; LDP 2000

Pioneer 6000, 6000A, 6010, 6020

Pioneer 4200, 8000

Panasonic OMDR TQ-2024; TQ-3032F

Computer System

IVD systems allow for a wide range of personal computers to be used. The majority of IVD applications currently utilize either IBM compatible (MS DOS) personal computers or the Apple line of computers.

When we were first evaluating IVD systems, Apple computers required the use of two monitors. One monitor displayed computer text and graphics while the other monitor displayed video information. At that time, hardware, referred to as an overlay card, did not yet exist that would allow a mixing of computer and video information on a single monitor. Since overlay boards were available for IBM compatible computers at the time, we developed this training application around the IBM compatible PC. A 386sx or 386dx or higher processor is recommended as the minimum configuration to best take advantage of the software typically used to control an IVD system.

Hard disk drive - Due to the size of authoring languages, text and graphics files, and related programs, large hard disk capacity is desirable. For this project, 40 megabyte hard drives were found to be satisfactory. In addition, the hard drive should be relatively fast. Avoid drives that report average access times longer than 23 ms.

Graphics card - To take advantage of the features of many authoring languages as well as overlay cards, VGA or higher resolution graphics cards are recommended. The graphics board used in this application was a standard VGA Board.

Overlay cards - For IVD systems that display computer text and graphics on the same monitor with video information, it is necessary to use an overlay card that can mix both forms of information. There are a variety of such cards available for both Apple and IBM compatibles. In this project we used a PSI VGAVISION I card produced by Processor Sciences, Inc. This card is not only compatible with the software used to control the IVD system but also allows for a variety of other video effects. One such effect used in this project was the compression and display of video in the upper quadrant of the monitor used in the second feedback screen (see Figure 1).

Some additional examples of VGA overlay cards include:

IBM M-Motions Video Adapter/A
IEV VIP-8000
Sony SMI-3081, Sony View 5000, 3015A
Video Logic DVA-4000
Visage 1910

Input Devices

Although individuals most often use the keyboard to interact with their personal computers, increasingly software used to control IVD systems require a pointing device such as a mouse, a trackball (an upside-down mouse that is stationary), or a touch screen.

For this project we used a Microsoft compatible mouse as an input device. Since a mouse is sometimes new to users, a short mouse exercise was developed to allow for practice prior to the start of the scripting program.

In addition to the use of a mouse, we have been developing a speech controlled input approach as an alternative to conventional pointing devices. For example, in this project a Covox Voice Master Key speech recognition and digitizer was used. To use this system the assessor first "trains" a program to recognize his/her voice by repeating key commands three times. Once the system has been trained, an assessor is able to perform such activities as answer multiple-choice questions, control the search, playback and stop features of the videodisc player solely by voice commands.

An additional feature of the Covox system that has been used in this project is the capability to digitally record audio information that may be played back at appropriate times. For example, when an assessor makes a correct or incorrect response, s/he may, in addition to a screen display, receive voice feedback. In the future voice feedback will be used to cue selected portions of the video. For example, during the observation of a video sequence, a voice signal can be used to alert an assessor to focus attention on an upcoming event.

Monitors

The choice of overlay card and graphics card will govern the type of monitor used. Since we used a PSI VGAVISION card, which combines the VGA and video information into a single VGA signal, a VGA monitor was required.

In this project we utilized a Mitsubishi Diamond Scan monitor AUM1381A. Some of the other monitors compatible with an overlay IVD system include:

InfoWindow
Matrox
Sony KV 1311, Sony KV 1311, Sony PVM-1270Q, Sony PVM-1271Q

Authoring system

An authoring language refers to a collection of programs that have been designed to assist the user to develop and manage a multimedia system like the IVD system discussed. Often such systems provide a variety of software tools that do not require computer programming skills. An example of the multimedia management referred to involves the process of displaying computer graphics and text, playing back specified portions of video based on subject responses, recording responses, and the like.

Initially several authoring systems were reviewed before IconAuthor (produced by AimTech) was selected. At that time IconAuthor not only supported the particular hardware system that we planned to use but also provided a system that allowed quick and easy prototyping of the IVD application described in this paper. This particular authoring system provides a series of tools such as:

Icons- a series of computer functions that are combined to build the IVD application;
An animation module- allows users to move graphics around the computer screen;
Color Graphics Editor- useful for drawing such objects as response buttons, etc.;
Video Editor- allows for on screen control of the videodisc player;
Text Editor- allows for the creation of text with a variety of fonts, sizes and colors.

Depending on your IVD requirements, there are a wide variety of authoring languages/systems available to users. For example, we understand that there are now over 117 such programs available.

As our needs within the IVD system grew, we found that there were certain features of the overlay card that could not be addressed by the authoring system. We therefore developed programs, written largely in Microsoft Basic 7.1 that did provide additional capabilities. Most users, however, will find that many of their IVD needs can be met by full-featured authoring systems.

Integrated Systems

Users who prefer a prepackaged (turnkey) IVD system may wish to consider one of the following:

IBM InfoWindow
Matrox EIDS System
Visage System
Sony View System

Summary and Conclusion

In this section each component of an IVD system was briefly described. It is interesting to note that in the past, costs associated with such systems ranged from $20,000 to $30,000. Increasingly, computer and related hardware and software costs have been declining to the extent that IVD systems are becoming affordable for increasing numbers of users.

If you anticipate developing an IVD system, in addition to hardware and software costs, there are costs associated with the specialized editing of videotape and the pressing of the videodisc. The editing costs vary greatly depending on the number of edits and or special effects required. We found such costs have averaged about $1000 per 30 minutes of video. For this project we used a glass check disc as a low cost alternative to the typically used master videodisc. Check discs are cost effective in very low volumes and generally cost $400 each. A master videodisc, on the other hand, generally costs approximately $3000 to $4000 but quickly becomes cost effective when a large number of copies are produced. Each additional copy made from a master videodisc can cost as little as $6 each. An overall estimate of costs associated with each IVD workstation used in this study ranged from $9000 to $10,000.

ADDITIONAL REFERENCES

For additional information on interactive videodisc technology, see the following:

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Minnesota Educational Computing Corporation: *Videodiscs for Education: A Directory* (2nd Ed.). St. Paul: MECC, 1987.

Nance, T.: Lighting a Path of the Future: *MacWorld: The Macintosh Magazine*, 1986, 3(2), 100-106.

Acknowledgments:

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Appendix A

I. **MANAGEMENT OF THE CLASSROOM ENVIRONMENT**

IA. **THE TEACHER PROMOTES A POSITIVE LEARNING ENVIRONMENT**

(1) Rapport
(2) Communication of expectations for achievement
(3) Physical environment

IB. **THE TEACHER MAINTAINS APPROPRIATE STANDARDS OF BEHAVIOR**

(1) Rules and standards of behavior are maintained

IC. **THE TEACHER ENGAGES THE STUDENT IN THE ACTIVITIES OF THE LESSON**

(1) Student engagement
(2) Re-engagement

ID. **THE TEACHER EFFECTIVELY MANAGES ROUTINES AND TRANSITIONS**

(1) Effectiveness

II. **INSTRUCTION**

IIA. **THE TEACHER CREATES A STRUCTURE FOR LEARNING**
(1) Initiations
(2) Closures

IIB. **THE TEACHER PRESENTS APPROPRIATE LESSON CONTENT**

(1) Choice of content
(2) Level of difficulty
(3) Accuracy

IIC. **THE TEACHER DEVELOPS THE LESSON TO PROMOTE ACHIEVEMENT OF THE LESSON OBJECTIVES**

(1) Lesson Development
(2) Use of instructional arrangements and materials

IID. **THE TEACHER USES APPROPRIATE QUESTIONING TECHNIQUES**

(1) Cognitive level
(2) Responding to students
(3) Opportunities for student involvement

IIE. **THE TEACHER COMMUNICATES CLEARLY, USING PRECISE LANGUAGE AND ACCEPTABLE ORAL EXPRESSIONS**

(1) Precision of communication
(2) Clarity of speech
(3) Oral expressions

III. **ASSESSMENT**

IIIA. **THE TEACHER MONITORS STUDENT UNDERSTANDING OF THE LESSON AND ADJUSTS INSTRUCTION WHEN NECESSARY**

(1) Monitoring for understanding
(2) Adjusting teaching when necessary

Defining Attribute: An Example

Indicator ID: **THE TEACHER EFFECTIVELY MANAGES ROUTINES AND TRANSITIONS**

Attribute: Effectiveness

The teacher should provide effective routines and transitions that reflect planning, established norms and a sense of structure. When appropriate, resources and materials should be organized and available. In addition, the amount of time spent on routines and transitions should be approriate for their purpose and makeup of the class. Depending upon the nature and purpose of a routine or transition, proceeding too quickly may be detrimental as taking too much time with the non-instructional activities.

Appendix B.

Sample question type: Verbatim evidence

VIGNETTE 1:

What question does the Teacher use to initiate the discussion?

* Do you think about the telephone as something you couldn't possibly live without?
* Do you think about the telephone as a nuisance?
* Do you think about the telephone as a nuisance that bothers you when you are trying to read something?
* Do you think about the telephone as a nuisance or something that you couldn't possibly live without?

Sample question type: Critical points in the lesson

VIGNETTE 1:

What does the teacher say at the beginning of the lesson to establish the rules of responding to the questions?

* Raise your hand if you have an answer.
* Think about the question before answering, raise your hand if you have something to share.
* Don't shout your answers out.
* Think about it being a nuisance before answering, and raise your hand if you think you have the correct answer.

Sample question type: Observational comments

VIGNETTE 1:

Which of the following accurately describes the behavior standards established in the classroom?

* Students raise hands and wait to be called on.

* Students continually call out.

* Students raise hands and answer.

* Students focus their attention solely on the teacher.

APPENDIX C

Beginning Educator Support and Training (BEST) Scripting Practice Questionnaire | **IVD**

Please take several minutes to complete the following questionnaire. Your comments about this laserdisc practice session will greatly assist us in making further improvements in the BEST assessment process. (*All individual information about this study will remain strictly confidential.*)

Name _____ Social Security _____

1. The session in which you participated has been designed to allow you to practice your scripting skills. What other skills or areas within this assessment you like training or practice?

_____

_____

2. Assuming each of the following opportunities was available, which of the following would you most likely attend? (*Please check the appropriate box.*)

	Unlikely to attend				**Highly likely to attend**
a. One-on-one refresher with a BEST trainer	☐	☐	☐	☐	☐
b. Small group refresher session	☐	☐	☐	☐	☐
c. Individual laserdisc practice	☐	☐	☐	☐	☐
d. Videotape practice at home using tapes and transcripts I may check out	☐	☐	☐	☐	☐

3. Please rate the following components of the laserdisc practice session with regard to its effectiveness. (*Please check the appropriate box.*)

	Ineffective				**Highly Effective**
a. Mouse training	☐	☐	☐	☐	☐
b. Use of mouse to answer questions	☐	☐	☐	☐	☐
c. Instructions on the computer screens	☐	☐	☐	☐	☐
d. The multiple-choice questions used	☐	☐	☐	☐	☐
e. Choice of video vignettes	☐	☐	☐	☐	☐
f. First form of feedback-replay of the video segment associated with questions	☐	☐	☐	☐	☐
g. Second form of feedback-replay and transcription information	☐	☐	☐	☐	☐
h. Overall feedback covering the three factors (e.g., verbatim evidence)	☐	☐	☐	☐	☐
i. Overall, the effectiveness of this practice session	☐	☐	☐	☐	☐

4. Final comments about any of the above that would assist us in improving this approach to the practice of scripting: *(Please use other side of page if necessary.)*

_____

_____

Beginning Educator Support and Training (BEST) Scripting Practice Questionnaire **VIDEO**

Please take several minutes to complete the following questionnaire. Your comments about this video practice session will greatly assist us in making further improvements in the BEST assessment process. (*All individual information about this study will remain strictly confidential.*)

Name _____ Social Security _____

1. The session in which you participated has been designed to allow you to practice your scripting skills. What other skills or areas within this assessment you like training or practice?

   _____

   _____

2. Assuming each of the following opportunities was available, which of the following would you most likely attend? (*Please check the appropriate box.*)

	Unlikely to attend				Highly likely to attend
a. One-on-one refresher with a BEST trainer	☐	☐	☐	☐	☐
b. Small group refresher session	☐	☐	☐	☐	☐
c. Individual videotape practice	☐	☐	☐	☐	☐
d. Videotape practice at home using tapes and transcripts I may check out	☐	☐	☐	☐	☐

3. Please rate the following components of the video practice session with regard to its effectiveness. (*Please check the appropriate box.*)

	Ineffective				Highly Effective
a. The choice of vignettes	☐	☐	☐	☐	☐
b. The multiple-choice questions used	☐	☐	☐	☐	☐
c. Overall feedback covering the three factors (i.e, verbatim evidence)	☐	☐	☐	☐	☐
d. Overall, the effectiveness of this practice session	☐	☐	☐	☐	☐

4. Final comments about any of the above that would assist us in improving this approach to the practice of scripting: *(Please use other side of page if necessary.)*

   _____

   _____

   _____

BEST Scripting Practice Questionnaire Section

Please take several minutes to complete the following questionnaire. Your comments about this session will greatly assist us in making further improvements in the BEST assessment process. (*All individual information about this study will remain strictly confidential*).

Name _____ Social Security No. _____

1. When did you originally receive your assessor training? Month:____ Year:____

2. When did you receive your most recent training? Month:____ Year:____

3. How many assessments have you conducted to date? _____

4. Briefly describe what you did to prepare yourself prior to conducting your first assigned assessment following the proficiency training sessions (use other side of page if needed):

   _____

5. The session in which you participated has been designed to allow you to practice your scripting skills. What other skills or areas within this assessment would you like training or practice?

   _____

   _____

6. Final comments about any of the above that would assist us in providing opportunities for practice. (*Please use otherside of sheet if necessary*).

   _____

   _____

Figure 1
Second Feedback Screen

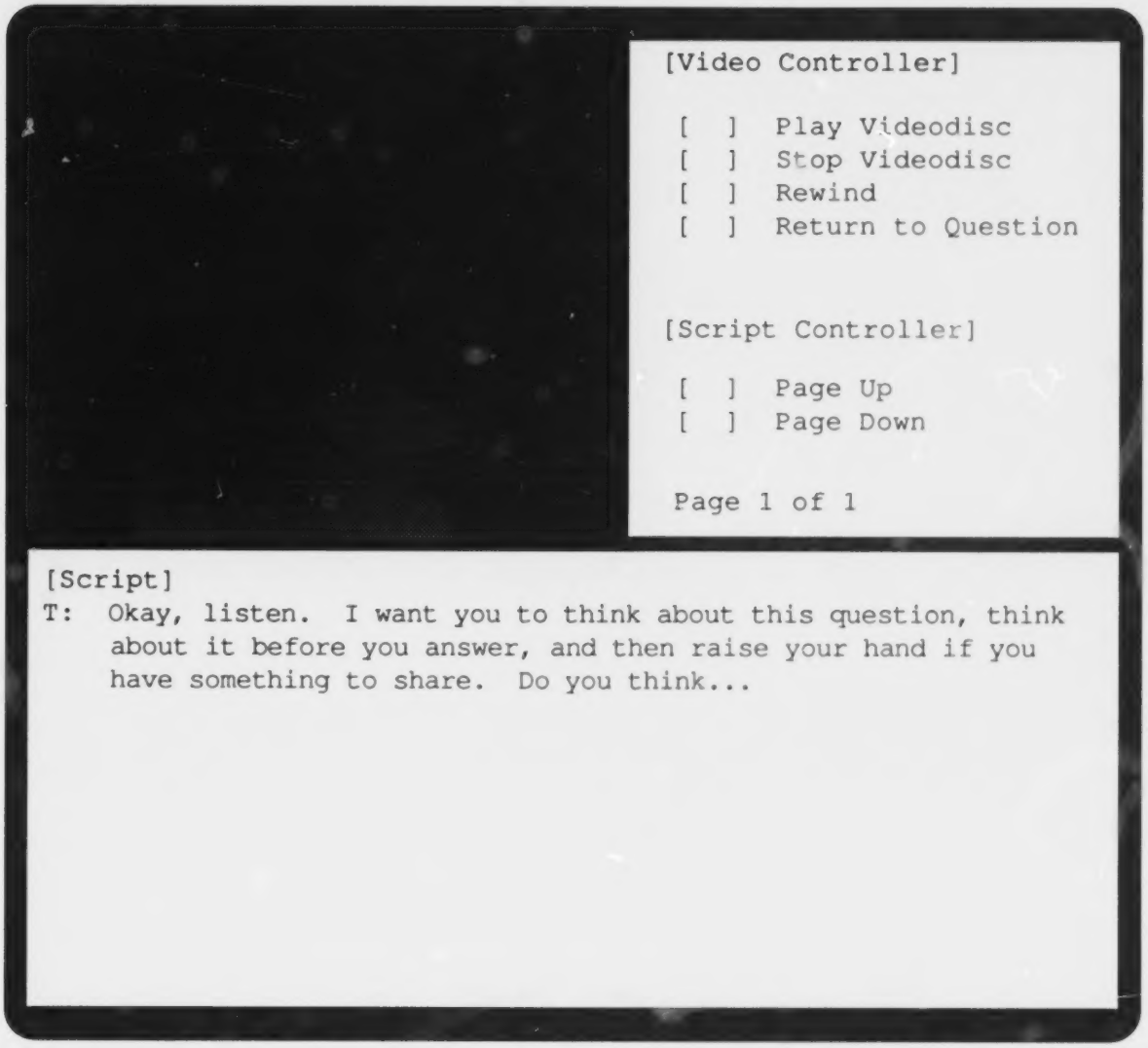
[Video Controller]
[ ] Play Videodisc
[ ] Stop Videodisc
[ ] Rewind
[ ] Return to Question
[Script Controller]
[ ] Page Up
[ ] Page Down
Page 1 of 1
[Script]
T: Okay, listen. I want you to think about this question, think about it before you answer, and then raise your hand if you have something to share. Do you think...

Figure 2
Interactive Videodisc Practice and Questioning Process

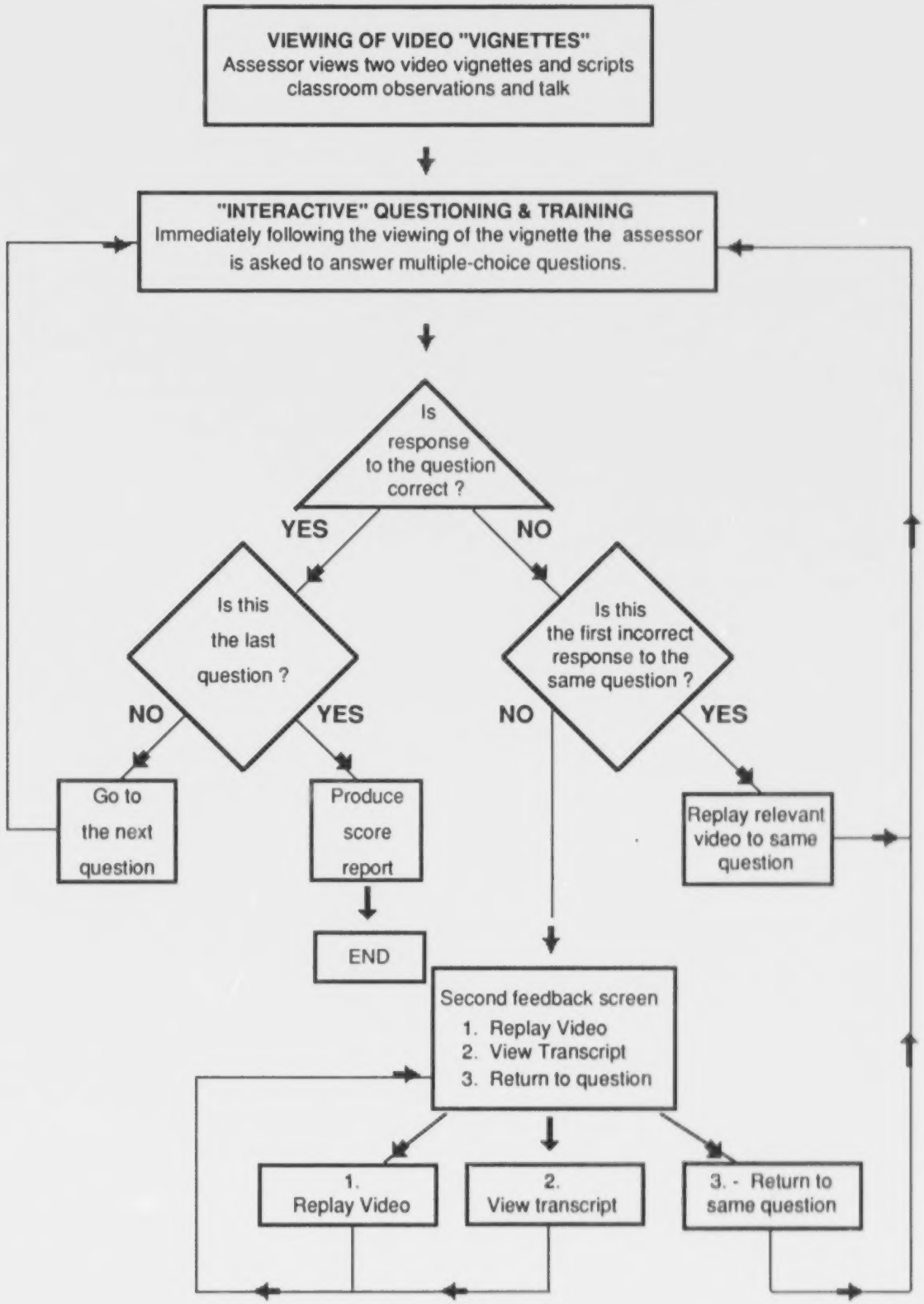
VIEWING OF VIDEO "VIGNETTES"
Assessor views two video vignettes and scripts classroom observations and talk
"INTERACTIVE" QUESTIONING & TRAINING
Immediately following the viewing of the vignette the assessor is asked to answer multiple-choice questions.
Is response to the question correct ?
YES
NO
Is this the last question ?
NO
YES
Is this the first incorrect response to the same question ?
NO
YES
Go to the next question
Produce score report
Replay relevant video to same question
END
Second feedback screen
1. Replay Video
2. View Transcript
3. Return to question
1. Replay Video
2. View transcript
3. - Return to same question

Figure 3
Components of the Interactive Videodisc System